DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-17 have been considered but are not persuasive.

Applicant has argued that Bergman does not disclose "a first dielectric layer having metallic nanoparticles formed on the metallic layer". Examiner kindly disagrees with applicants assertions. Simply put, Bergman discloses a "dielectric host", common sense would dictate and it is the position of the Office that a dielectric host is the equivalent of a dielectric layer. Especially giving the fundamental principals of surface plasmon resonance (SPR) measurement devices which utilize both a dielectric and a metallic layer in contact with one another for the purpoases of generating Plasmon resonance. For the "dielectric host" of Bergman not to be a "dielectric layer" would go against the basic fundamentals of the SPR sensor.

As to applicants argument that the type of metallic nanoparticle of Bergman is different than that of applicant's invention, it is noted that the features upon which applicant relies (i.e., "mixedly distributed metallic nanoparticles") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant has argued that the cited prior art does not teach the use of metallic nanoparticles in multiple dielectric layers. Bergman teaches that metallic nanoparticles can be placed in dielectric layers, one of ordinary skill in the art at the time of the claimed invention

would realize that through routine experimentation and the teachings of Bergman, metallic nanparticles could be placed in a plurality of dielectric layers of a SPR device.

2. Examiner notes that in the art rejection to Johansen in section 3 of the Final Rejection dated 11/20/2007, examiner inadvertently omitted to change the names of Florin to Johansen. The applicants assumption in response to the rejection was correct, the rejection has been maintained below and the names have been switched to correctly identify the prior art used in the rejection.

3. Applicant has argued that the prior art cited does not teach the teachings of claim 3, particularly that the metallic nanoparticles are between 1-50nm in size. It is believed applicant erroneously stated claim 3 but in actuality meant to argue the claim limitations of claim 9 instead. Examiner has further clarified the rejection to more clearly show where said claim limitations can be found.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2, 6-10, 12 rejected under 35 U.S.C. 103(a) as being unpatentable over Florin et al. (USPN '667, hereinafter Florin) in view of Lin et al. (USPN '520 B1, hereinafter Lin) and further in view of Bergman et al. ("Spaser: Quantum Generation of Coherent Surface Plasmons in Nanosystems", hereinafter Bergman).

Claims 1, 9-10

Florin in conjunction with Fig. 1 discloses a surface plasmon resonance sensor comprising a prism 3 having a surface on which a metallic layer is coated 10, a first dielectric layer having metallic nanoparticles formed on the metallic layer 6, a light source 1 giving off a light to the prism 3, the light being reflected by the surface of the prism to form a reflected light, and a light detector for detecting the reflected light (col. 1, lines 30-46, col. 3, line 48-col. 4, line 4, col. 5, lines 40-53, col. 6, line 64-col. 7, line 19, col. 7, line 52-col. 8, line 10).

Florin discloses the use of a metal/dielectric interface in a surface plasmon resonance (SPR) sensor, however Florin fails to disclose the use of multiple dielectric layers. Lin shows that is known to use a plurality of dielectric layers (col. 3, lines 1-20, col. 4, lines 1-6) within an SPR sensor. It would have been obvious to combine the device of Florin with the multiple dielectric layer sensor of Lin for the purposes of providing depth measurements of different biological molecules under test (col. 9, lines 8-22).

While the thin films of both Johansen and Lin are on the nanoparticle level, neither specifically discloses metallic silver nanoparticles in a dielectric layer. Bergman shows that there is an interest and quite extensive research on the use of metallic nanoparticles between 1-50 nm (claims 9-10, 2nd page 2nd column) in size in a dielectric material used in an SPR sensor (claims 1, 9-10, pg. 1-second column, pg. 2-second column, page 3-first column). Given the in depth teaching of Bergman, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to combine the teachings of Florin with the knowledge that adding metallic nanoparticles to a dielectric layer enable enhanced measurement resolution of nanoscale localized optical frequency fields (pg. 4, second column).

Claims 2 & 12

Florin as applied above in view of Bergman discloses a second dielectric layer coated on the first dielectric layer, and the teaching of Bergman that metallic nanoparticles can be placed in dielectric host layers (col. 6, line 64-col. 7, line 19).

Claims 6-8

Florin as applied above further discloses wherein both metal films consist of gold and silver (col. 6, lines 38-40).

5. Claims 1, 3-7, 9-11, 12-17 rejected rejected under 35 U.S.C. 103(a) as being unpatentable over Johansen (USPN '094) in view of Lin et al. (USPN '520 B1, hereinafter Lin) and further in view of Bergman et al. ("Spaser: Quantum Generation of Coherent Surface Plasmons in Nanosystems", hereinafter Bergman).

Claims 1, 9-10

Johansen in conjunction with Figs. 1a & 2a discloses a surface plasmon resonance sensor comprising a prism 210 having a surface on which a metallic layer is coated 220, a metallic nanoparticle layer formed on the metallic layer 230, a light source 120 giving off a light to the prism 210, the light being reflected by the surface of the prism to form a reflected light 490, and a light detector 510 for detecting the reflected light 490 (col. 4, lines 32-35, lines 42-47, col. 5, lines 3-6, lines 42-55, col. 6, lines 31-61).

Johansen discloses the use of a metal/dielectric interface in a surface plasmon resonance (SPR) sensor, however Florin fails to disclose the use of multiple dielectric layers. Lin shows that is known to use a plurality of dielectric layers (col. 3, lines 1-20, col. 4, lines 1-6) within an

SPR sensor. It would have been obvious to combine the device of Johansen with the multiple dielectric layer sensor of Lin for the purposes of providing depth measurements of different biological molecules under test (Lin, col. 9, lines 8-22).

While the thin films of both Johansen and Lin are on the nanoparticle level, neither specifically discloses metallic silver nanoparticles in a dielectric layer. Bergman shows that there is an interest and quite extensive research on the use of metallic nanoparticles between 1-50 nm (claims 9-10, 2nd page 2nd column) in size in a dielectric material used in an SPR sensor (claims 1, 9-10, pg. 1-second column, pg. 2-second column, page 3-first column). Given the in depth teaching of Bergman, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to combine the teachings of Johansen with the knowledge that adding metallic nanoparticles to a dielectric layer enable enhanced measurement resolution of nanoscale localized optical frequency fields (pg. 4, second column).

Claims 3, 4

Johansen as applied above further discloses a wherein the light source comprises a semiconductor laser array for radiating multiple laser beams (col. 4, lines 43-48 & col. 6, lines 24-30), a polarizing device and a half-wave plate for adjusting polarized components of the laser beams (col. 5, lines 19-21 & col. 6, lines 32-46). Johansen does not explicitly state the use of a ½ wave plate, Official Notice Taken. Johansen discloses the use of "polarizing equipment" (col. 6, line 36), it is the position of the Office that is it well known and well within the knowledge of someone of ordinary skill in the art at the time of the claimed invention to use a ½ wave plate, ¼ wave plate or equivalent in an SPR system to help adjust/control the state of polarization of incident illumination light upon a sample under test.

Johansen discloses the use of a Wollaston prisms which is spectral prism as claimed in claim 4 (col. 6, lines 35-36).

Claims 5, 6

Johansen as applied above further discloses wherein the metallic layer is comprised of gold or silver (col. 4, lines 32-36).

Claims 7, 10

Johansen as applied above further discloses wherein the metallic layer and dielectric layer is approximately 50 nm thick (col. 5, lines 35-63).

Claim 11

Claim 11 is a product-by-process claim. The patentability of product-by-process claims is not limited to the manipulations of the recited steps, only the structure implied by the steps. All of the claimed structural limitations have been disclosed as shown above in view of Johansen. The method steps claimed would not result in a structurally different apparatus that was made by a different process such as an evaporation process.

Claims 13, 14

Johansen as applied above further discloses comprising a self-assembled monolayer adjacent the metallic nanoparticle layer comprised of one of the functional groups SH, NH_2, CHO, COOH, and Biotin (col. 6, lines 50-63).

Claims 15-17

The method is taught by the functions set forth with regards to the apparatus claims 1, 3, 4, 13, & 14 as rejected above in view of Johansen.

Conclusion

6. All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JUAN D. VALENTIN whose telephone number is (571)272-2433. The examiner can normally be reached on Mon.-Fri..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Gregory J. Toatley, Jr./
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09 Jun 08

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/JDVII/
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